

(c) Hose assemblies may be installed between two points of relative motion but shall not be subjected to torsional deflection (twisting) under any conditions of operation and shall be limited, in general, to reasonable lengths required for flexibility. Special consideration may be given to the use of longer lengths of flexible hose where required for proper operation of machinery and components in the hydraulic system.

(d) Sharp bends in hoses shall be avoided.

#### § 58.30-25 Accumulators.

(a) An accumulator is an unfired pressure vessel in which energy is stored under high pressure in the form of a gas or a gas and hydraulic fluid. Accumulators must meet the applicable requirements in § 54.01-5 (c)(3), (c)(4), and (d) of this chapter or the remaining requirements in part 54.

(b) If the accumulator is of the gas and fluid type, suitable separators shall be provided between the two media, if their mixture would be dangerous, or would result in contamination of the hydraulic fluid and loss of gas through absorption.

(c) Each accumulator which may be isolated, shall be protected on the gas and fluid sides by relief valves set to relieve at pressures not exceeding the maximum allowable working pressures. When an accumulator forms an integral part of systems having relief valves, the accumulator need not have individual relief valves.

[CGFR 68-82, 33 FR 18878, Dec. 18, 1968 as amended by CGD 77-147, 47 FR 21811, May 20, 1982]

#### § 58.30-30 Fluid power cylinders.

(a) The requirements of this section are applicable to those hydraulic and pneumatic systems listed in § 58.30-1 and to all pneumatic power transmission systems.

(b) Fluid power cylinders consisting of a container and a movable piston rod extending through the containment vessel, not storing energy but converting a pressure to work, are not considered to be pressure vessels and need not be constructed under the provisions of part 54 of this subchapter.

(c) Cylinders shall be designed for a bursting pressure of not less than 4

times the maximum allowable working pressure. Drawings and calculations or a certified burst test report shall be submitted to show compliance with this requirement.

(d) Piston rods, except steering gear rams, shall either be of corrosion resistant material or shall be of steel protected by a plating system acceptable to the Commandant.

(e) Materials selection shall be in accordance with the requirements of § 58.30-15(b).

#### § 58.30-35 Testing.

(a) All fluid power and control systems and components thereof shall be tested as required by this section.

(b) Accumulators constructed as pressure vessels under the provisions of part 54 of this subchapter shall be tested and retested as required by parts 54 and 61 of this subchapter.

(c) Fluid power and control systems and piping assemblies shall be given an installation test as follows:

(1) Fluid power and control systems and piping assemblies and associated equipment components, including hydraulic steering gear, in lieu of being tested at the time of installation, may be shop tested by the manufacturer to  $1\frac{1}{2}$  times the maximum allowable pressure of the system. The required test pressure shall be maintained for a sufficient amount of time to check all components for strength and porosity and to permit an inspection to be made of all connections.

(2) Fluid power and control systems and associated hydraulic equipment components which have been tested in conformance with paragraph (c)(1) of this section and so certified by the manufacturer, may be tested after installation as a complete assembly by stalling the driven unit in a safe and satisfactory manner and by blowing the relief valves. Otherwise, these systems shall be hydrostatically tested in the presence of a marine inspector at a pressure of  $1\frac{1}{2}$  times the maximum allowable pressure.

(3) Fluid power and control systems incorporating hydropneumatic accumulators containing rupture discs may be tested at the maximum allowable working pressure of the system in lieu of  $1\frac{1}{2}$  times this value as prescribed in